

We claim:

1. A method for establishing a label switched path across multiple autonomous systems, the method comprising:

5 mapping a first label from a first autonomous system to a second label in a second autonomous system;

receiving from said first autonomous system a protocol message including said first label;

10 replacing said first label with said second label in said protocol message; and

forwarding said protocol message to a downstream neighboring (next hop) device in said second autonomous system.

2. The method of claim 1, comprising:

establishing an incoming label switched path over said first autonomous system;

associating said first label with said incoming label switched path;

establishing an outgoing label switched path over said second autonomous system;

learning said second label associated with said downstream neighboring (next hop) device in said second autonomous system;

20 mapping said first label from said first autonomous system to said second label in said second autonomous system;

receiving from said first autonomous system said protocol message including said first label;

replacing said first label with said second label in said protocol message; and

25 forwarding said protocol message to said downstream neighboring (next hop) device in said second autonomous system.

3. The method of claim 2, wherein establishing said outgoing label switched path over said second autonomous system comprises:

30 using a Label Distribution Protocol to set up said outgoing label switched path to a downstream neighboring border device.

4. The method of claim 2, wherein learning said second label associated with said downstream neighboring (next hop) device in said second autonomous system comprises:

establishing a Label Distribution Protocol session with said downstream neighboring (next hop) device; and

5 receiving said second label associated with said downstream neighboring (next hop) device in said second autonomous system via said Label Distribution Protocol session.

5. The method of claim 2, wherein mapping said first label from said first

10 autonomous system to said second label in said second autonomous system comprises:

maintaining a label information base; and

creating in said label information base a label information base entry mapping said first label from said first autonomous system to said second label in said second autonomous system.

6. A device for establishing a label switched path across multiple autonomous systems, the device comprising:

mapping logic operably coupled to map a first label from a first autonomous system to a second label in a second autonomous system;

5 receiving logic operably coupled to receive from said first autonomous system a protocol message including said first label;

replacing logic responsive to the receiving logic and operably coupled to replace said first label with said second label in said protocol message; and

10 forwarding logic responsive to the replacing logic and operably coupled to forward said protocol message to a downstream neighboring (next hop) device in said second autonomous system.

7. The device of claim 6, comprising:

first label switched path establishing logic operably coupled to establish an incoming label switched path over said first autonomous system and associate said first label with said incoming label switched path;

second label switched path establishing logic responsive to said first label switched path establishing logic and operably coupled to establish an outgoing label switched path over said second autonomous system;

20 label distribution logic operably coupled to obtain said second label from said downstream neighboring (next hop) device in said second autonomous system;

mapping logic operably coupled to map said first label from said first autonomous system to said second label in said second autonomous system;

25 receiving logic operably coupled to receive from said first autonomous system said protocol message including said first label;

replacing logic responsive to said receiving logic and operably coupled to replace said first label with said second label in said protocol message; and

30 forwarding logic responsive to said replacing logic and operably coupled to forward said protocol message to said downstream neighboring (next hop) device in said second autonomous system.

8. The device of claim 7, wherein said second label switched path establishing logic comprises Label Distribution Protocol logic.

5 9. The device of claim 7, wherein said label distribution logic comprises Label Distribution Protocol logic operably coupled to establish a Label Distribution Protocol session with said downstream neighboring (next hop) device and receive said second label associated with said downstream neighboring (next hop) device in said second autonomous system via said Label Distribution Protocol session.

10 10. The device of claim 7, further comprising a label information base, wherein said mapping logic is operably coupled to create in said label information base a label information base entry mapping said first label from said first autonomous system to said second label in said second autonomous system.

11. A program product comprising a computer readable medium having embodied therein a computer program for establishing a label switched path across multiple autonomous systems, the computer program comprising:

5 mapping logic programmed to map a first label from a first autonomous system to a second label in a second autonomous system;

receiving logic programmed to receive from said first autonomous system a protocol message including said first label;

10 replacing logic responsive to the receiving logic and programmed to replace said first label with said second label in said protocol message; and

15 forwarding logic responsive to the replacing logic and programmed to forward said protocol message to a downstream neighboring (next hop) device in said second autonomous system.

20 12. The program product of claim 11, comprising:

first label switched path establishing logic programmed to establish an incoming label switched path over said first autonomous system and associate said first label with said incoming label switched path;

25 second label switched path establishing logic responsive to said first label switched path establishing logic and programmed to establish an outgoing label switched path over said second autonomous system;

label distribution logic programmed to obtain said second label from said downstream neighboring (next hop) device in said second autonomous system;

mapping logic programmed to map said first label from said first autonomous system to said second label in said second autonomous system;

20 receiving logic programmed to receive from said first autonomous system said protocol message including said first label;

replacing logic responsive to said receiving logic and programmed to replace said first label with said second label in said protocol message; and

30 forwarding logic responsive to said replacing logic and programmed to forward said protocol message to said downstream neighboring (next hop) device in said second autonomous system.

13. The program product of claim 12, wherein said second label switched path establishing logic comprises Label Distribution Protocol logic.

14. The program product of claim 12, wherein said label distribution logic comprises
5 Label Distribution Protocol logic programmed to establish a Label Distribution Protocol session with said downstream neighboring (next hop) device and receive said second label associated with said downstream neighboring (next hop) device in said second autonomous system via said Label Distribution Protocol session.

10 15. The program product of claim 12, wherein said mapping logic is programmed to maintain a label information base and to create in said label information base a label information base entry mapping said first label from said first autonomous system to said second label in said second autonomous system.

16. A communication system comprising a plurality of autonomous systems, each autonomous system having at least a border device that is shared with another autonomous system, wherein the shared border device links an incoming label switched path from an incoming autonomous system to an outgoing label switched path in an outgoing autonomous system.

17. An information base comprising at least one entry mapping a first label from a first autonomous system to a second label in a second autonomous system.